Stock Market's Reaction to Macroeconomic Variables: Evidence from Indian Stock Market

A

Synopsis

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INTRODUCTION

"Stock exchange in an association, organization or body of individuals whether incorporated or not, establish for the purpose of assisting, regulating and controlling business in buying, selling and dealing securities."

-Securities Contracts (Regulations) Act, 1956

The Indian economy is characterized as a developing market economy. It is the fifth largest economy in the world in terms of nominal Gross Domestic Product (GDP) ($ 2.936 Trillion) and ranked third largest in terms of GDP Purchasing Power Parity (PPP) ($ 11.326 Trillion). As per International Monetary Fund (IMF) data and reports published in 2018, Indian economy ranked 142nd by GDP (Nominal) and 119th by GDP (PPP) on per capita income. According to Ministry of Commerce and Industry (India), India's export is $ 330 billion and import is $ 514 billion in the financial year 2018-19. According to NITI Aayog, India need a nominal growth rate of 12.5 % to achieve a target of $ 5 trillion GDP by 2024.

Indian economy is considered as a growth engine of the world's economy with the ever increasing and expanding economy. Stock market of such robust economy is the face of the growing market and companies in it. India has one of the oldest and the fastest stock market platform i.e. Bombay Stock Exchange (BSE). Stock market is basically an electronic platform where the companies are listed and stock is traded. The stock market avail long-term capital to the listed firms by pooling funds from different investors and allow them to expand their businesses and also offer investors alternative investment avenues to put their surplus funds in. Investors carefully watch the performance of stock markets by observing the composite market index, before investing funds. Because of this advanced platform it is possible for companies to raise capital from public efficiently and effectively. Indian capital market has undergone a series of radical changes after the waves of economic reform since 1991 in Indian economy. This resulted in remarkable improvement in Indian stock market in terms of its size and depth. With the economic reforms in the country, stock exchanges have grown exponentially in terms of foreign institutional investment and transaction turnover. However, unlike mature stock markets of developed economics, the stock markets of emerging economy like India are characterized as most volatile stock markets. Day to day happenings and news are reflected in the

stock market, some of them may be relevant while others may be irrelevant. Moreover, the stock market of emerging economics including India are likely to be sensitive to factors such as changes in the level of economic activities, changes in political and international economic environment and also related to the macroeconomic factors. Stock market is one of the most sensitive assets to economic condition.

Several systematic and unsystematic variables have an impact on the business houses and vice versa. The profitability of the business houses reflect in the market prices of the stocks which in turn affect the benchmark indexes. An economic indicator is a statistic about an economic activity and allow analysis of economic performance and predictions of future performance. Economic indicators include various indices, earnings reports and economic summaries such as unemployment rate, Consumer Price Index (a measure for inflation), industrial production, Gross Domestic Product, money supply changes, etc.

STOCK EXCHANGES IN INDIA

Indian stock market is the oldest among all in Asia. The Bombay Stock Exchange (BSE) is known as the largest and oldest stock exchange of India, established in 1875, it facilitates growth to the Indian corporate sector by providing it an efficient capital-raising platform. National Stock Exchange (NSE) is the 11th largest stock exchange in the world in terms of market capitalization. NSE's key index is NIFTY50, an index of fifty major stocks weighted by market capitalization. In India, there are six main Stock Exchanges registered under Securities and Exchange Board of India (SEBI) such as **BSE Ltd., Calcutta Stock Exchange Ltd., India International Exchange (India INX), Metropolitan Stock Exchange of India Ltd., NSE Ltd., NSE IFSC Ltd.,** out of these BSE and NSE are the two main Stock Exchanges. Most of the trading in Indian Stock Market takes place on these two stock exchanges. Both the exchanges follow the same trading hours, trading mechanism, settlement process, etc.In India from last three decades stock market performed in many ways. Stock market has seen all time high and big crisis also during the period.

The conventional method to estimate stock price is through econometric model and various statistical tools. With the rapid growth in technological sector, soft computing technique has become one of the

emerging techniques of stock market prediction, such as fuzzy systems, neural networks and machine learning, etc. These methods are collectively known as soft computing techniques.

REVIEW OF LITERATURE

The dynamic relationships between macroeconomic variables and stock returns have been widely discussed and debated. Many researchers tried to show reliable associations between macroeconomic variables and stock returns worldwide. Some of the relevant reviews in this relation are provided, which are classified into two categories such as international and national.

INTERNATIONAL REVIEW OF LITERATURE

S.No	AUTHOR	YEAR	TITLE AND JOURNALNAME	OBJECTIVES	FINDINGS
1	Assagaf, A., Murwaningsari, E., Gunawan, j. and Mayangsari,S.	2019	The Effect of Macro Economic Variables on Stock Return of Companies That Listed in Stock Exchange: Empirical Evidence from Indonesia *International Journal of Business and Management*	This study aims to analysis the effect of macroeconomic variables on the overall return of company shares which is a proxy with changes in the composite stock price index.	This study found that macroeconomic variables consisting of inflation rates, interest rates, money supply, and foreign exchange rates, stock returns have a significant effect on companies on the Indonesia Stock Exchange.
2	Celebi, K. and Hönig, M.	2019	The Impact of Macroeconomic Factors on the German Stock Market: Evidence for the Crisis, Pre- and Post-Crisis Periods *International Journal of Financial Studies*	To investigates the impact of macroeconomic factors, German government bond yields, sentiment and other leading indicators on the main German stock index	Researcher found evidence that across most subsamples, the Composite Leading Indicator (OECD), the Institute for Economic Research (ifo) Export Expectations index, the ifo Export Climate index, exports, the Consumer Price Index CPI, as well as 3 year German government bonds yields show delayed impacts on stock returns. Further found that the delayed impact of the constituents of the monetary aggregate M2 on stock returns changed direction between the crisis and post-crisis periods.
3	Ndlovu, B., Faisal, F., Resatoglu, N.G. and	2018	The Impact of Macroeconomic Variables on Stock Returns: A Case of the Johannesburg	The study assessed association of macroeconomic variables:	The researcher found that the long run, interest rates, money supply and inflation have a positive relationship with the share price while

	Türsoy, T.		Stock Exchange *Romanian Statistical Review*	inflation (INF), Money supply growth (M3), Interest rates (IR) and USD ZAR exchange rate (EX) on stock price for the Johannesburg Stock Exchange South Africa.	the exchange rate have a negative effect to the stock prices. Unidirectional causality was found running from exchange rates and interest rates to the share price and also the interest rates and the exchange rates have a causality to the money supply. The variance decompositions established that shocks to the share price account for majority of the changes in itself for all periods during the short run and long-run while also cementing results of the causality shocks in the stock price and exchange rate shocks have an impact on changes in themselves, also the impulse response function further confirmed causal Relationships between the variables and the stock price.
4	Epaphra, M. and Salema, E.	2018	The impact of macroeconomic variables on stock prices in Tanzania *Journal of Economics Library*	This paper examines the relationship between stock prices and macroeconomic variables namely, inflation rate, Treasury bill rate, exchange rate and money supply in Tanzania.	The empirical analysis reveals that macroeconomic variables and the stock prices are co-integrated across all models and, hence, a long-run equilibrium relationship exists between them. Equally important, all regression models pass the specification tests of heteroscedasticity, serial correlation, Ramsey RESET test of specification and Jacque-Bera Normality test. The overall model regression results show that money supply and exchange rate have a positive effect on stock prices. By contrast, Treasury bill rate tends to have a negative effect on stock prices. Inconsistent with the a priori expectation, inflation rate seems to exert no impact on overall stock prices. However, individual firms' regressions show that the coefficient on inflation is negative and statistically

					significant in 6 models but weakly significant in 2 models, and positive and statistically significant in 1 model.
5.	Megaravalli, A.V. and Sampagnaro G.	2018	Macroeconomic indicators and their impact on stock markets in ASIAN 3: A pooled mean group Approach *Cogent Economics & Finance*	The objective of this paper is to examine the long-run and the short-run relationship between India, China and Japanese stock markets and key macroeconomic Variables such as exchange rates and inflation (provided by consumer price Index) of ASIAN 3 economies (India, China and Japan).	The findings of pooled estimated results of ASIAN 3 countries show that exchange rate has a positive and significant long-run effect on stock markets while the inflation has a negative and insignificant long-run effect. In the short run, there is no statistically significant relationship between macroeconomic variables and stock markets. This study emphasizes on the impact of macroeconomic variables on the stock market performance of a developing economy (India and China) and developed economy (Japan).
6	Barakat, M.R. , Elgazzar, S.H. and Hanafy, K.M.	2016	Impact of Macroeconomic Variables on Stock Markets: Evidence from Emerging Markets *International Journal of Economics and Finance*	The key objective of this study is to shed light on the relationship between the stock market and macroeconomic factors in two emerging economies (Egypt and Tunisia) for the period from January 1998 to January 2014.	Results indicated that there is a causal relationship in Egypt between market index and consumer price index (CPI), exchange rate, money supply, and interest rate. The same goes for Tunisia except for CPI, which had no causal relationship with the market index. Results also revealed that the four macroeconomic are co-integrated with the stock market in both countries.
7	Czapkiewicz, A. and Stachowicz, M.	2016	The long-run relationship between the stock market and main macroeconomic variables in Poland *Managerial Economics*	The Objective of the study is to investigate the long-run relationship between stock market and macro-economic variables in Poland stock exchange	The results indicated the existence of one cointegrating relationship between the WIG20 price, EUR/PLN exchange rate, export volume, and rate of inflation CPI. However, the export variable had a neglected impact on the stock market in the long-term

					relationship. The biggest impact on the stock market had the EUR/PLN exchange rate. The impact of CPI on the stock market is rather moderate. We also concluded that CPI moves away from the equilibrium state with a rather-slow rate, whereas the EUR/PLN comes to the equilibrium state At a similar pace.
8	Moghaddam, A.H., Moghaddam, M.H. and Esfandyari, M.	2016	Stock market index prediction using artificial neural network *Journal of Economics, Finance and Administrative Science*	In this study the ability of artificial neural network (ANN) in forecasting the daily NASDAQ stock exchange rate was investigated.	The model outputs show that there is no distinct difference between the prediction ability of the four and nine prior working days as input parameters.
9	Ali, M. and Jamil, R.A.	2015	Impact of Macroeconomic Variables on Stock Market Returns: A Case of Karachi Stock Exchange *SSRN Electronic Journal*	The aim of this paper is to investigate the linkage between macroeconomic variables (inflation rate, exchange rate and interest rate) on stock market returns in Pakistan.	The study showed that there is weak connection between macroeconomic variables and stock market returns. The research validates the findings of earlier studies as well as conclusions and recommendations are discussed.
10	Gurlovelee n, K. and Bhatia, B.S.	2015	An Impact of Macroeconomic Variables on the functioning of Indian Stock Market: A Study of Manufacturing Firms of BSE 500 *Journal of Stock &Forex Trading*	The study investigated the impact of macroeconomic variables on the functioning of Indian Stock Market.	It was found that Foreign Institutional Investors became stationary at level, Call Money Rate, Crude Oil Price, Exchange Rate, Foreign Exchange Reserve, Gross Fiscal Deficit, Inflation Rate and Trade Balance at Its difference and Broad Money and Index of Industrial Production at IInd difference. The two macroeconomic variables Foreign Institutional Investors and Exchange Rate were found significant. It has been observed that these variables have no relationship with closing prices of BSE 500

					Manufacturing firms. The study also revealed that the Indian Stock Market was a weak form efficient because no relationship was found amongst the variables during the study period.
11	Kibria, U. , Mehmood, Y. , Kamran, M. , Arshad, M.S. , Perveen, R. and Sajid, M.	2014	The Impact of Macroeconomic Variables on Stock Market Returns: A Case of Pakistan *Research Journal of Management*	The specific purpose of this research is to search out effect of macroeconomic variables including money supply, discount rate, gross domestic savings, inflation, and GDP per capita on stock returns.	The consequences of Granger Causality test shows that the GDP savings and Exchange rate does unidirectional Granger Cause Money supply. On other side GDP savings also unidirectional Granger Cause the KSE. The results of Regression Analysis show that the Inflation, Exchange rate, Money supply, GDP per capita and GDP savings has positive significant impact on KSE 100 index.
12	Ouma, W.N. and Muriu, P.	2014	The Impact Of Macroeconomic Variables On Stock Market Returns In Kenya *International Journal of Business and Commerce*	This study investigates the impact of the macroeconomic variables on stock returns in Kenya	According to the findings of the study, Money Supply, exchange rates and inflation affect the stock market returns in Kenya. Money supply and inflation are found to be significant determinants of the returns at Nairobi Securities Exchange. Exchange rates is however, found to have a negative impact on stock returns, while interest rates is not important in determining long rung run returns in the NSE.
13	Makan, C. , Abuja , AvneetKa ur and ChauhanS.	2012	A Study of the Effect of Macroeconomic Variables on Stock Market: Indian Perspective *Munich Personal RePEc Archive*	The main objective is to investigate the relationship between Indian stock market and seven macroeconomic variables namely Index of Industrial production (IIP), Consumer price Index (CPI), Call Money Rate (CMR), Dollar Price	On the basis of overall analysis and sectoral analysis it can be concluded that three out of seven variables are relatively more significant and likely to influence Indian stock market. These factors are exchange rate, foreign institutional investment and call rate. There is a positive relation between FII and Sensex, call rate and Sensex whereas exchange rate and Sensex shows a negative relation.

				(DP), Foreign Institutional Investment (FII), Crude Oil Prices (CO), Gold Price (GP).	
14	Naik, P.K. and Padhi, P.	2012	The Impact of Macroeconomic Fundamentals on Stock Prices Revisited: Evidence from Indian Data *Eurasian Journal of Business and Economics*	The study investigates the relationships between the Indian stock market index (BSE Sensex) and five macroeconomic variables, namely, industrial production index, wholesale price index, money supply, treasury bills rates and exchange rates over the period 1994–2011.	The analysis reveals that macroeconomic variables and the stock market index are co-integrated and, hence, a long-run equilibrium relationship exists between them. It is observed that the stock prices positively relate to the money supply and industrial production but negatively relate to inflation. The exchange rate and the short-term interest rate are found to be insignificant in determining stock prices. In the Granger causality sense, macroeconomic variable causes the stock prices in the long-run but not in the short-run. There is bidirectional causality exists between industrial production and stock prices whereas, unidirectional causality from money supply to stock price, stock price to inflation and interest rates to stock prices are found.
15	Pal, K. and Mittal, R.	2011	Impact of Macroeconomic indicators on Indian capital markets *The Journal of Risk Finance*	The objective of this paper is to examine the long-run relationship between the Indian capital markets and key macroeconomic variables such as interest rates, inflation rate, exchange rates and gross domestic savings (GDS) of Indian economy.	The findings of the study establish that there is co-integration between macroeconomic variables and Indian stock indices which is indicative of a long-run relationship. The ECM shows that the rate of inflation has a significant impact on both the BSE Sensex and the S&P CNX Nifty. Interest rates on the other hand, have a significant impact on S&P CNX Nifty only. However, in case of foreign exchange rate, significant impact is seen only on BSE Sensex. The changing GDS is observed as insignificantly associated with both the BSE

					Sensex and the S&P CNX Nifty. The paper, on the whole, conclusively establishes that the capital markets indices are dependent on macroeconomic variables even though the same may not be statistically significant in all the cases.
16	Abu-Libdeh, H. and Harasheh, M.	2011	Testing for correlation and causality relationships between stock prices and macroeconomic variables The case of Palestine Securities Exchange *International Review of Business Research Papers*	This study aims at investigating the correlation and causality relationships between stock prices in Palestine and some macroeconomic variables.	The results of the regression analysis as a whole indicate a significant relationship between the macroeconomic variables used and stock prices. Nevertheless, some macroeconomic variables' coefficients (although having a significant relationship with stock prices) weren't consistent with the results of other researches. Moreover, the causality analysis negated any kind of causal relationships between each particular macroeconomic variable and stock prices.
17	Ali, M.B.	2011	Impact of Micro and Macroeconomic Variables on Emerging Stock Market Return: A Case on Dhaka Stock Exchange (DSE) *Interdisciplinary Journal of Research in Business*	This paper investigates the impact of changes in selected microeconomic and macroeconomic variables on stock returns at Dhaka Stock Exchange.	Based on regression coefficient, it was found that inflation and foreign remittance have negative influence and industrial production index; market P/Es and monthly percent average growth in market capitalization have positive influence on stock returns. All the independent variables can jointly explain 44.48 percent variation in DSE all-share price index. No unidirectional Granger Causality is found between stock prices and all the predictor variables under study except one unidirectional causal relation from stock price and market P/Es''. In a nut shell, lack of Granger causality between stock price and selected micro and macro variables ultimately reveals the evidence of informationally inefficient market.

18	Ahmed, S.	2008	Aggregate Economic Variables and Stock Markets in India *International Research Journal of Finance and Economics*	The objective of the study is to investigates the nature of the causal relationships between stock prices and the key macro-economic variables representing real and financial sector of the Indian.	The results of the study reveal differential causal links between aggregate macro-economic variables and Stock indices in the long run. However, the revealed causal pattern is similar in both Markets in the short run. The study indicates that stock prices in India lead economic Activity except movement in interest rate. Interest rate seems to lead the stock prices. The study indicates that Indian stock market seems to be driven not only by actual performance but also by expected potential performances. The study reveals that the movement of stock prices is not only the outcome of behavior of key macro-economic variables but it is also One of the causes of movement in other macro dimension in the economy.
19	Bhattacharya B and Mukherjee J.	2003	Causal Relationship Between Stock Market And Exchange Rate, Foreign Exchange Reserves And Value Of Trade Balance: A Case Study For India *Scientific Research Publishing*	This paper investigates the nature of the causal relationship between stock prices and macroeconomic aggregates in the foreign sector in India.	The results suggest that there is no causal linkage between stock prices and exchange rate, foreign exchange reserves and value of trade balance
20	Adrangi, B., Chatrath, A. and Sanvicente, A.Z.	2002	Inflation, Output, And Stock Prices: Evidence From Brazil *The Journal of Applied Business Research*	Research in economics and finance documents a puzzling negative relationship between stock re-turns and inflation rates in markets of industrialized economies. The	The researcher shows that the negative relationship between the real stock returns and unexpected inflation persists after purging inflation of the effects of the real economic activity. The Johansen and Juseliuscointegration tests verify a long-run equilibrium between stock prices, general price levels, and the real economic activity.

				present study investigates this relationship for Brazil.	Furthermore, stock prices and general price levels also show a strong long-run equilibrium with the real economic activity and each other. The findings lend support to Fama's proxy hypothesis in the long-run.

NATIONAL REVIEW OF LITERATURE

S. No	AUTHOR	YEAR	TITLE & JOURNAL NAME	OBJECTIVES	FINDINGS
1	Keswani, S. and Wadhwa, B.	2019	An Empirical Analysis on Association Between Selected Macroeconomic Variables and Stock Market in the Context of BSE *The Indian Economic Journal*	1. To know the association between Disposable income, Government policies, IR, exchange rate, inflation and stock returns in BSE 2. To know the cointegration between DI, GP, IR, exchange rate, inflation and stock returns in BSE.	The results showed that the residues are normally distributed and that there is no problem of multicollinearity, heteroskedasticity and serial correlation. The results of the cointegration showed a strong long-term relationship among DI, GP, the inflation rate, the exchange rate and the IR on the stock price in Bombay Stock Exchange of India. Results of vector error correction model revealed that in the short run, there was a negative and significant relationship between inflation rate and stock returns; therefore, it can be implied that an increase in the inflation rate eroded the prospect of positive performance among the Sensex but was not significant.
2	Garg, K. and Kalra, R.	2018	Impact Of Macroeconomic Factors On Indian Stock Market *Parikalpana – KIIT Journal of Management*	The aim of the study is to analyze the relationship between selected macroeconomic factors and Indian stock market price.	The result shows that there is a positive relationship between the Sensex and macroeconomic factors except avg. inflation and unemployment rate as they show negative relationship.
3	Rehman, M.	2017	Dynamics of Co-movements among Implied Volatility, Policy Uncertainty and Market Performance	To examines the dynamic correlation among policy uncertainty, stock returns and implied volatility.	The presence of a heterogeneous pattern during the financial crises period indicated significant dynamic correlation values with persistence. Extraneous variables, that is, exchange rate changes and oil prices, also influenced the dynamic

			Global Business Review		correlation pattern between implied volatility index and stock market returns. Findings of this article suggest that the time-varying property exists among correlations and is sensitive to the financial turmoil and exchange rate changes.
4	Giri, A. K. and Joshi, P.	2017	The Impact Of Macroeconomic Indicators On Indian Stock Prices: An Empirical Analysis *Studies in Business and Economics*	The purpose of the present study is to examine the long run and the short run relationship between stock price and a set of macroeconomic variables for Indian economy using annual data from 1979 to 2014.	The results confirm a long run relationship among the variables. Evidence suggests that Economic growth, inflation and exchange rate influence stock prices positively. However, crude oil price influences the stock price negatively. This implies that the increase in oil price induces inflationary expectation in the mind of investors and hence stock prices are adversely affected. The VECM result indicates that short run and long run unidirectional causality running from economic growth and FDI to stock prices in India. The result of the variance composition shows that stock market development in India is mostly explained by its own shocks.
5	Kotha, K.K. and Sahu, B.	2016	Macroeconomic Factors and the Indian Stock Market: Exploring Long and Short Run Relationships *International Journal of Economics and Financial Issues*	This paper aims to examine long and short run relations between selected macroeconomic indicators and stock market returns with reference to India.	The study reveals the presence of long run relation between the BSE Sensex and select macroeconomic indicators viz., Exchange Rate, wholesale price index, T-bill rates and M3.
6	Mohanam ani, P.	2014	Indian Stock market and Aggregate macroeconomic variables: Time Series Analysis *IOSR Journal of Economics and Finance*	This study investigates the impact of macroeconomic variables on the behavior of Indian Stock market.	The analysis reveals that Indian stock market is positively whole sale price index, money supply and industrial productivity. The exchange rate and inflow of foreign institutional investment are found to be insignificant to Indian Stock market. In the Granger Causality sense, whole sale price index and industrial productivity influence the stock market to a great extent.

7	Venkatraja, B.	2014	Impact Of Macroeconomic Variables On Stock Market Performance In India: An Empirical Analysis *International Journal of Business Quantitative Economics and Applied Management Research*	The study investigates the relationship between the Indian stock market performance (BSE Sensex) and five macroeconomic variables, namely, index of industrial production, wholesale price index, gold price, foreign institutional investment and real effective exchange.	The regression model summary endorses a very strong combined influence of independent variables on the Sensex. From the results, it appears that 82 per cent of variation in Sensex is explained by the five selected macroeconomic factors. Wholesale price index, index of industrial production, foreign institutional investment and real effective exchange rate have high degree of positive influence on Sensex. It is also found that Sensex is inversely influenced by changes in gold price. Further, of the five variables, the coefficients of all the variables except index of industrial production are statistically significant. This leads to the conclusion that inflation, inflow of foreign institutional investment,exchange rate and gold price significantly impact the Indian stock market performance.
8	Tripathi, V. and Seth, R.	2014	Stock Market Performance and Macroeconomic Factors: The Study of Indian Equity Market *Global Business Review*	The objective is to explore the relation especially the short- and long-run causal relation between stock market performance and six important macroeconomic	Researcher found five co-integrating relationships between stock market and macroeconomic variables. These results suggest that the stock prices movement is not only the result of behaviour of key macroeconomic variables but it is also one of the important reasons of movement in other macro dimension in the economy.
9	Kumar, R.	2013	The Effect of Macroeconomic Factors on Indian Stock Market Performance: A Factor Analysis Approach *IOSR Journal of Economics and Finance*	The objective of this paper is to find the influence of macroeconomic variables on the Indian stock market through the data reduction technique of factor analysis.	It has been found that industrial performance play significant role in influencing the stock market. Though some impact of policy rates cannot be denied but it does not seem sustainable. Market rely more on optimistic macroeconomic environment call for state's prudent efforts to maintain macro stability. Besides, stock market responds to performance of the firm specific factors and unforeseen events in the economy.

10	Sangmi, M. and Hassan, M.	2013	Macroeconomic Variables on Stock Market Interactions: The Indian Experience *IOSR Journal of Business and Management*	To study the relationship between stock prices and macro-economic variables in India.	The result of this paper indicates that significant relationship is occurred between macroeconomics variables and stock price in India.
11	Patel, S.	2012	The effect of Macroeconomic Determinants on the Performance of the Indian Stock Market *NMIMS Management Review*	The study investigates the effect of macroeconomic determinants on the performance of the Indian Stock Market.	The study found the long run relationship between macroeconomic variables and stock market indices. The study also revealed the causality run from exchange rate to stock market indices to IIP and Oil Price.
12	Saxena, S and Bhadauriya, S.	2012	Causal analysis of Oil Prices and Macro economic Performance: Evidence from India *Asia-Pacific Journal of Management Research and Innovation*	1. To examine the stationarity in the Indian macroeconomic indicators and international crude oil prices, and 2. To analyse the causal relationship between international crude oil prices and selected Indian macroeconomic Indicators.	The empirical analysis that covers data series of 10 financial years from April 2000 to March 2010 is done by using Unit Root Test and Granger Causality Test in Vector Autoregressive (VAR) framework. The findings of the study indicate that inflation in India has bidirectional causal relationship with international crude oil prices..
13	Bhunia, A.	2012	A Causal Relationship between Stock Indices and Exchange Rates-Empirical Evidence from India *Research Journal of Finance and Accounting*	This paper examines the causal relationship between stock prices and exchange rates	The results of empirical study indicate that there is Bidirectional causal relationship between exchange rate and all stock market indices. While the negative causality exists from national, services, financials and industrials indices to exchange rate, there is a positive causal relationship from technology indices to exchange rate. On the other hand, negative causal relationship from exchange rate to all stock market indices is determined.
14.	Geetha	2011	The	This study aims	The study revealed that there is

	,C. , Mohidin, R. and Chandran , V.V.		Relationship Between Inflation And Stock Market: Evidence From Malaysia, United States And China. *International Journal of Economics and Management Science*	to find the relationship between inflation and stock Return.	long run relationship between expected and unexpected inflation with stock returns but there is no short run relationship between these variables for Malaysia and US but it exists for China.
15	Gunaseka rage A. and Pisedtasal asai A.	2004	Macroeconomic Influence on the Stock Market: Evidence from an Emerging Market in South Asia *Journal Of Emerging Market Finance*	This study examines the influence of macroeconomic variables on stock market equity values in Sri Lanka	The VECM analyses provide some support for the argument that the lagged values of Macroeconomic variables such as the consumer price index, the money supply and the treasury bill rate have a significant influence on the stock market. The treasury bill rate demonstrates the strongest influence on price changes compared to other variables. However, the share price index does not have any influence on Macroeconomic variables except for the treasury bill rate.

NEED OF THE STUDY

It has been observed that most of the researchers have focused on limited number of macroeconomic variables. So, there is a need to examine more number of macroeconomic variables which may help in estimating Indian stock market more accurately. Majority of the research work has been conducted either on BSE SENSEX index or on NSE NIFTY 50 Index. So a need arises to study both the indices at the same time to identify which one is more affected by the macroeconomic variables. Secondly, majority of the researchers used secondary data to conduct their studies and no primary data is used. So, there is need to examine investors' perception regarding impact of macroeconomic variables on stock market and identify the macroeconomic variables considered by the investors which affect their investing decision in stock market. Additionally, all the researchers have used econometrics and various statistical tools to analyse the impact of macroeconomic variables on stock market. And Very few researchers have used soft computing technique to predict the impact of macroeconomic variables

on performance of stock market. Soft computing technique is one of the emerging techniques for stock market prediction, so it is great need to use soft computing techniques as well as econometrics and various statistical tools for predicting the impact of macroeconomic variables on performance of stock market. This study will help the professionals, investors and various other people in their investment decision making process. In addition, comparison which will be done in the study between various statistical methods, econometrics methods and soft computing techniques used for predicting stock market will help the investors to know the most accurate and reliable method for predicting the stock market.

OBJECTIVES OF THE STUDY

1. To study the impact of selected macroeconomic variables on the performance of BSE SENSEXIndex and NSE NIFTY 50 Index.
2. To predict the impact of macroeconomic variables on the performanceof BSE SENSEX Index and NSE NIFTY 50 Index by Econometrics Model.
3. To predict the impact of macroeconomic variables on theperformance of BSE SENSEX Index and NSE NIFTY 50 Index by Soft Computing Model.
4. To identify the more reliable and accurate method in between Econometrics Model and Soft Computing Model to predict the impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index.
5. To know Investors' perception regarding the impact of macroeconomic variables on stock market.

RESEARCH HYPOTHESES

H_{01} : There is no significant impact of macroeconomic variables on BSE SENSEX Index.

H_{02} : There is no significant impact of macroeconomic variables on NSE NIFTY 50 Index.

H_{03} : Macroeconomic variables do not Granger Cause BSE SENSEX Index.

H_{04} : Macroeconomic variables do not Granger Cause NSE NIFTY 50 Index.

(Same Hypotheses will be framed for different macroeconomic variables)

H_{05} : There is no significant difference in perception of investors regarding impact of macroeconomic variables on stock market.

RESEARCH METHODOLOGY

This study will consider both primary and secondary data; accordingly research methodology is also divided into two parts:

FOR SECONDARY DATA

Sample Size and Selection Criteria

Bombay Stock Exchange SENSEX index and National Stock Exchange NIFTY 50 index will be taken for the purpose for the study. The selection of BSE SENSEX index and NSE NIFTY 50 index is based on the review of literature, as most of the researchers have selected the major index of the country for their studies. At present there are six main Stock Exchanges registered under Securities and Exchange Board of India such as **BSE Ltd., Calcutta Stock Exchange Ltd., India International Exchange (India INX), Metropolitan Stock Exchange of India Ltd., NSE Ltd. andNSE IFSC Ltd.,** out of these BSE Ltd. and NSE Ltd. are two main stock exchanges of India. In terms of market capitalization, BSE Ltd. ranked 10th and NSE Ltd. ranked 11th in the worldas on May 2019 (*Source: Statista.com*). BSE SENSEX Index and NSE NIFTY 50 Index are the main indices of these two stock exchanges.

The macroeconomic variables will be selected on the basis of previous research papers, theses, research articles and reports, etc.

Duration of the Study

For achieving the different objectives of the study researcher will consider fifteen financial years*i.e.*, 2006-07 to 2020-21.

Collection of Data

Selected indices data will be collected from official website of the BSE Ltd. and NSE Ltd. Macroeconomic variables data will be collected from the official website of Reserve Bank of India, Government reports, publications and other related sources.

Data Analysis Tools

For achieving the different objectives, various statistical, econometrics and soft computing methods will be used. Average, Standard Deviation, Kurtosis, Skewness, Correlation, Regression, Unit Root Test, Granger Causality Test, OLS Model, ARCH and GARCH Model, etc. will be used. The expected software which is going to be used is MATLAB and language Python for developing soft computing models. Regime shift technique will also be used.

FOR PRIMARY DATA

Sample Size and Selection Criteria

Researcher will consider the sample ofat least 200 investors. Investors will be selected on the basis judgmental sampling (investors will be considered on the basis of share market 3 years' experience).

Collection of Data

Primary data for the research will be collected through the Questionnaire which will be collected from200 investors of the stock market.

Data Analysis and Presentation Tools

Collected data will be analyzed by using various statistical tools like Percentages, Average, Chi-square test, etc. The researcher is intended to use different software to analyze the data. For the presentation of data various presentation tools will be used like Tables, Bar Diagrams, Graphs, etc.

OBJECTIVE WISE RESEARCH METHODOLOGY

S. NO.	OBJECTIVES	METHODOLOGY
1.	To study the impact of selected macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index.	Researcher will collect the data of macroeconomic variables and both the selected stock market indices and to study the impact researcher will use different tools like correlation and regression, Granger Causality Test, etc.
2.	To predict the impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index by Econometrics Model.	To achieve this objective, researcher will use ARCH and GARCH to develop a model for predicting the impact on BSE SENSEX index and NSE NIFTY 50 index performance on the basis of macroeconomic variables.
3.	To predict the impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index by Soft Computing Model.	On the basis on available data researcher will develop efficient and accurate soft computing model in virtual environment and predict the impact on BSE SENSEX index and NSE NIFTY 50 index performance on the basis of macroeconomic variables.MATLAB and Python language will be used for developing soft computing model.
4.	To identify the more reliable and	This objective will be achieved by testing, validating

	accurate method in between Econometrics Model and Soft Computing Model to predict the impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index.	and comparingthe data by the developed models under objective 2nd and 3rd.
5.	To know Investors' perception regarding the impact of macroeconomic variables on stock market.	For achieving this objective, the researcher will serve the questionnaire to appropriate number of investors in order to select at least 200 investors. For analysis of the questionnaire mean, weighted average and chi-square test etc. will be used.

PROPOSED CHAPTER PLAN OF THE STUDY

Chapter 1	Introduction
Chapter 2	Review of Literature
Chapter 3	Overview of Stock Market and Macroeconomic variables
Chapter 4	Impact of Macroeconomic variables on performance of BSE SENSEX Index and NSE NIFTY 50 Index
Chapter 5	Prediction of impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index byEconometrics Model
Chapter 6	Prediction of impact of macroeconomic variables on the performance of BSE SENSEX Index and NSE NIFTY 50 Index by Soft Computing Model
Chapter 7	Testing, Validating and Comparison of econometrics model and soft computing model.
Chapter 8	Analysis of Investors' Perceptions regarding impact of macroeconomic variables on stock market
	Findings, Suggestions & Conclusion References Bibliography Appendix

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